

The Perfect Systems Analysis Project

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Abstract

Systems Analysis and Design, a course traditionally offered in the information systems major, has long been problematic for some students and instructors. For a number of reasons, valid and invalid, students today come to the systems analysis course looking for concrete computer-based skills and find they are asked to learn other things. These topics include for example: questionnaire design, program evaluation research technique (PERT), return on investment, and oral presentation. Given the crisis in software development, that a large percentage of developed projects are never implemented, the author believes it is unwise to eschew software development in a systems analysis class. Having students work on a project with a real user, a project which will only be implemented at the user's discretion, a project which is visible to the entire world, may be the best way of communicating the importance of user satisfaction, even if it is at the expense of learning other material. The author proposes a solution in the form of a model, which guides students in building faculty web pages.

Keywords: systems analysis, user satisfaction, web pages, software development

1. SYSTEMS ANALYSIS ISSUES

The systems analysis and design course as a textbook experience

Systems Analysis and Design, a course traditionally offered in the information systems major has long been problematic for some students and instructors. This course is typically a textbook experience for students and so students may view it as abstract or boring. Most classroom time is spent away from the computer, partially because the nature of the subject matter is people-oriented rather than machine-oriented. Systems analysis and design focuses on interaction with the user rather than interaction with the computer. In fact, students may be advised that "systems analysts must be extroverted" and that "some people simply do not possess the necessary outgoing personality" to be successful in the field (Whitten, 1998).

The historical basis for the textbook approach

There is also a techno-social historical basis for a text-book approach to this course. In the early years of computing, large corporations separated the job of the systems analyst from the job of the programmer. The analyst was the employee with the bachelor's degree, possibly in a liberal arts area, or more recently, the business-oriented employee with an MBA degree. The analyst's job was to communicate with the users and to determine what they wanted. The programmer, whose formal training was often limited to a certificate from a technical school, was viewed as a low-level technician whose value lay in implementing what he or she was told to do by the analyst. Analysts rarely did any programming and programmers were deemed to be incapable of the communication and conceptualization that analysts were responsible for. This dichotomy continues to be acknowledged, to some extent, today. (Stair, 1999). Colleges and universities accordingly de-emphasized programming as part of the business major or MBA program. In fact, in the mid 1980s, based on the author's personal

experience, students could graduate from an MBA program with a major in information systems and have almost no knowledge of programming.

As PC-based systems became more popular, and development time shrank, the software developer became a combination of analyst and programmer and technical skills become more highly-valued. Corporations began to look for individuals with both business and computer programming skills. In part, this led to the birth of the information systems major. Accordingly, the information systems major currently includes courses in programming and software package use, yet systems analysis remains an anomaly at many schools, a textbook course.

De-emphasizing the technical aspect of systems analysis and design may also reflect the fact that for large systems development projects, some corporations continue to rely on non-technical personnel as project leaders. It is also the author's experience that students with little or no programming background are often hired for systems analysis positions. Some educators believe that a greater percentage of tomorrow's systems analysts will come from non-computing backgrounds and will work directly for end users (Whitten, 1999). The more recently developed, popular techniques of rapid application development (RAD) and joint application development (JAD) recognize the necessity for ongoing input from both technical and business personnel. In these methodologies, a team is responsible for the software development project rather than simply the systems analyst or programmer (Shelly, 1998).

Practical considerations

There may be more practical reasons for limiting systems analysis to the textbook; the cost of case tool software, used for analyzing and designing systems remains high. A textbook incorporating the Student Edition of Visible Analyst™ software, an edition which is considerably limited when compared to the Professional Version, may currently cost as much as \$100. The cost of this software is considerably reduced from twelve years ago when this author first taught the course. Some instructors use Microsoft Visio™, a less costly diagramming tool, but this software offers no case tool features. Data flow diagrams can be created, for example, but they cannot be seamlessly exploded and their components automatically entered into a data dictionary.

The difficulty in developing real projects

Some instructors send students off to find a systems analysis and design project of their own choice and execute it, and other instructors may try to place students in corporations to work on an assigned project. Both of these scenarios present many difficulties. Firstly, projects vary in scope and difficulty and so grading can result in an unfair outcome. Secondly, many real projects may not fit

neatly within a semester or real problems impeding their completion may surface. Thirdly, if a project is involved and requires understanding a business process, there may not be enough time for the student to really understand it. Furthermore, a project necessarily involves other employees and they may be unwilling to spend the time required to have students really be successful. Fourthly, the instructor will be required to spend a great deal of time learning all the projects in order to evaluate them. Last but not least, if the college or university has made a commitment to the projects, the instructor may end up having to complete them, if students drop the ball.

Summarizing, for a number of reasons, valid and invalid, students today come to the systems analysis course looking for concrete computer-based skills and find they are asked to learn other things. These topics include for example: questionnaire design, program evaluation research technique (PERT), return on investment, and oral presentation. Although the skills involved are worthwhile, students may question the lack of a real software development experience. Reasons for not including such an experience include: "systems analysis has always been taught this way"; "systems analysis focuses on the user, not technical issues"; "case tool software is too expensive"; "information systems is a business discipline, not solely a technical discipline"; and "it's too impractical to implement real projects in one semester."

Should systems analysis be hands-on?

Given the crisis in software development (Callon, 1996), that a large percentage of developed projects are never implemented and billions of dollars are lost as a result (Wysocki, 1998), is it wise to eschew software development in a systems analysis class? Certainly the main focus of the course should be on total quality management or defining the success of a system by the level of satisfaction of the user. Readily available quality videos address this issue (Creating, 1996), and numerous real life examples of systems failure (Manes, 1999) provide ample opportunities for discussion, but is this enough? Having students work on a project with a real user, a project which will only be implemented at the user's discretion, a project which is visible to the entire world, may be the best way of communicating the importance of user satisfaction, even if it is at the expense of learning other material.

Attempts to make systems analysis real to students

Many textbooks such as Shelly, Cashman, Rosenblatt's (1998) Systems Analysis and Design, and Kendall & Kendall's (1998) Systems Analysis and Design try to make systems analysis real through the case study method. For example, students follow software development at one or more varied organizations through the stages of the systems development process. So at the end of the course, by

following project development at a medical practice, a retail company, and a manufacturer, the student may have exposure to an order system, a manufacturing system, and a service-based sales system. These systems hopefully serve as paradigms for the student when the student enters the real world, where such systems are commonly developed. In some cases, textbooks implement these case studies in a web based version so that they seem more realistic. The problem with these case studies, despite the fact that there is no flesh and blood person to interview, is that students know they are not real. They do not invest themselves emotionally in solving the problems these case studies present.

What types of projects are realistic?

Even though information systems majors are exposed to software packages and programming, prior to taking systems analysis, and some colleges require several such courses as prerequisites, students may lack the skills to implement systems. In public colleges, some portion of the student body is likely to be composed of transfer students who may not have been exposed to the same exact software as non-transferees. Also, software knowledge may vary depending upon the instructors each student has had. In many cases, students learn bits and pieces of software and may not be able to put them together in a meaningful way. Therefore, it is more realistic for the instructor to base a project upon a piece of software that can easily be learned within the semester. This creates a level playing field and allows the students to focus on analysis and design rather than the mechanics of the particular software employed for the project.

2. A PRACTICAL SOLUTION

Building web pages for faculty, a right-sized project

Despite the fact that finding the right project is not fool-proof, the author suggests that involving students in building web pages for faculty is relatively easy to implement, has a high chance of success, provides a worth-while learning experience in accordance with the objectives of the course, and is well-received by students. At Ramapo College implementing such a project was funded by the Ramapo College Foundation. The author received approximately \$2,000 which was expended on books related to the selected software package, Microsoft Front Page 98™, and several SONY Mavica™ digital cameras. The advantage of these cameras, besides ease of use, is that the recording medium, a floppy diskette, is inserted directly into the camera. The camera can be passed from student to student, even within the classroom, and no connection to the PC is required.

First implementation of the project

The first time the project was implemented, the author employed a three-stage approach which began with demonstrating the features of Microsoft Front Page 98™. Then, the students were assigned both an individual and a group project to ensure participation of each student. The individual project assignment appears in the Appendix.

The goal of the individual project was two-fold. First, to compel the student to become familiar with the software and second, to provide the client with a working prototype demonstrating many of the features of the software. The author's expectation was that the prototype page would be helpful in having the instructor and student brainstorm different designs and settle on something satisfactory. This expectation was not fulfilled. Despite the fact that the author showed the students a number of existing faculty web pages, mounted on the College server, neither students nor faculty had a clear idea of what a faculty web site should include.

Students also had considerable difficulty implementing many of the features of Front Page 98™, most particularly the hover button and multi-level lists. Near the end of the course, the author discovered that some of the difficulties were due to the fact that the software had not been installed correctly on the local area network.

In effect, the individual project was intended as a warm-up or precursor for the group project, the outcome of which was intended to be a mountable web page for the instructor. The group project assignment appears in the Appendix.

The group project required students to work in groups of three or four which turned out to be too many students for the task. The student in the group who was strongest technically ended up doing most of the work, while the other students were disengaged. The author intended that students in the following semester would pick up these projects where the first group left off, but this turned out to be impractical.

Of the five projects produced, two were acceptable and one was excellent. The major problem was that the instructors were unhappy with the layout and physical appearance of the pages. Students created flashy pages with numerous animations which in most cases were unsuitable for an academic environment. The instructors could not communicate what they wanted on their pages because they didn't know. The students' interests were so diverse from the instructors, that the result in most cases was unacceptable. Only one of the web pages was eventually completed by other students and mounted. The most positive aspect of the project was that it served to educate faculty regarding web sites and generated some general interest throughout the entire department.

Second implementation of the project

The second time the project was implemented, the author provided the students with more detailed information on what to include in the

faculty web site. Requirements for the group project appear in the Appendix.

Students worked in groups of two on the group project. Being directive in the assignment, as far as what to include in the instructor's site, proved to be vital. Most, but not all instructors did want syllabi, vita, reference links, and course descriptions. Most instructors were happy with the pre-packaged templates Front Page 98™ provides and did not want elaborate color schemes and animations. In some cases, instructors specifically asked that less information be placed on their sites. In most cases, the sites were quite simple and easy to navigate which added to their success. Of the two sites created, nine were acceptable or excellent. Feedback from faculty was extremely positive. Students enjoyed the project and grew from the experience.

The individual project was also recast to better reflect faculty interests. Students were directed to spend less time on flash, and more time on features such as framed pages and bookmarks that are suited to faculty web sites. The requirements for the individual project appear in the Appendix.

Real problems provide real experience

Because students encountered many challenges in working with faculty during the first implementation, for the second implementation, the group project was introduced during the first week of class. Every faculty member in the department expressed interest in the project and students were instructed to introduce themselves and establish rapport with faculty immediately. Students were permitted to form their own groups and to select their own clients.

The most common issue students had to deal with was the unavailability of faculty. Faculty would make appointments and not keep them which was a hardship for many employed students. Students were not in a position to complain.

The second issue students faced was that most documents, such as syllabi, were not on disk or could not be easily located by faculty. Students spent a great deal of time reformatting MS-Word™ documents which incorporated tabs and other spacing that did not transfer, when the documents were save in .html format. Students also spent time scanning documents or retyping them. Students were surprised by the amount of "grunt" work necessary to produce a site.

Some students were also surprised at the lack of knowledgeable faculty as well as the fact that they, the students, were often given free rein in designing the sites. This role reversal was handled well by most students.

The only issue for the instructor was that some students developed their web sites using web

development software such as Cold Fusion™ and Claris Home Page™ despite being specifically instructed to use Front Page™. It was not practical to confront students on this issue. In the future, sites will be developed using Claris Home Page™ because most users find it simpler to learn and the College has acquired the necessary licenses.

3. CONCLUSION

The course incorporated the traditional elements of systems analysis and design including data flow diagrams, decision tables, project payback estimation and the like, but what engaged the students most was the web project. The author believes that this project provided students with the most useful experience they could hope for at this point in their careers, and given the positive outcome, ventures to guess it is what they will remember about the course, twenty years from now.

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Appendix
Systems Analysis
Spring, 1999
Building an Instructor's Web Site Using FrontPage 98

Individual Project

Generally, users do not know what a particular software package can do for them. Part of the systems analyst's job is to become familiar enough with a variety of software so that he or she can successfully select the best software for each project or problem that needs to be addressed.

Now that we have spent several classes looking at FrontPage 98, you should have a good idea of the capabilities of this software.

Design and build a demonstration web site, (2-3 pages) to display these features to your client. Your site **must** be tailored to the interests and needs of your particular client, e.g. Prof. Tarallo. A statement of these needs should be included on the page: For example:

This site provides you with the ability to view many of the features of FrontPage 98. Wherever possible, these features will be labeled. Marketing professors will note in particular: 1) links to marketing information on the web 2) marketing related graphics, etc.

You must include:

- a framed page
- clip art which you have modified using the Image Composer
- graphic image you have inserted
- hyperlinks
- text in different fonts
- text which you have modified using the Image Composer, e.g. special effects
- a variety of colors
- a variety of lists
- a table
- an image map
- a themed page - (use a second, separate web site)
- a form, including a variety of elements such as check boxes, drop-down menus, radio buttons, and text boxes
- a hover button
- an animated GIF
- a scrolling marquee
- a web page background
- a horizontal line
- a comment, using the comment feature
- other features you find interesting

Note: the appearance of your pages should be attractive, interesting, and appropriate to the academic environment, rather than a mish-mosh of features.

Class lab time will be available.

Systems Analysis
Spring, 1999
Building an Instructor's Web Site Using FrontPage 98

Group Project

For the Group Project be prepared to:

- a) demonstrate the site to the class
- b) explain the user's requirements
- c) explain how each technical element works
- d) discuss any problems or issues that developed in working with the client and how you dealt with them
- e) discuss the user's training needs
- f) discuss the next steps to be taken in further developing the site
- g) discuss what you learned/what surprised you in working with the client and developing the site

- h) discuss the strengths and weaknesses of FrontPage 98
- h) share with the class any other material you feel will help other students in working on the web and/or working with clients (extra credit!)

Hand in documentation of the site, which will enable another student to pick up where you left off, and further develop it.

Materials to include:

- a) summary of your oral report
- a) files on disk including web pages and other source documents
- b) diagram of hyperlinks
- c) materials to be scanned
- etc.

Other:

All group members must participate in the presentation, which should take about 10 minutes.

The site must be developed in FrontPage 98™. Why? The College has selected this tool because of its ease of use and because we receive free licenses to the software. Faculty receive instruction in this software and will be expected to maintain their sites, using this software.

Systems Analysis
Building Web Pages for SAB Instructors
Spring, 2000

Group Project

Create a web site for your client faculty member in **Front Page 98 using the Personal Web Template and an appropriate theme.**

Create the following 6 pages under the Home page:

Vita
Courses
Syllabi
Publications
Links
Interests

On the interest page, include a photograph (jpeg or GIF) preferably of your instructor. If this is not possible, use another instructor's photo. (These can be saved from other faculty's web pages, as shown in class).

Create a tasteful and appropriate interests page in Microsoft Word. Save the file as an html file. Insert the file into the Interests web page. Edit the file if necessary.

Use the College catalog, web page, etc. to construct a Courses page appropriate for your faculty client, as shown in class, with course descriptions.

Obtain a copy of several of your instructors' syllabi from the SAB secretaries. You may be able to obtain the syllabus as a disk file or you can scan a printed copy. Create hyperlinks on the Syllabi page and link at least one full-text syllabus.

Using a web search engine, e.g. Yahoo, Altavista, find several web sites related to your instructor's academic discipline. Create hyperlinks to these sites on the Links page.

Create a vita page with an email hyperlink and a publications page, again, preferably with information from your client. If this is not possible, use materials from other faculty web sites.

Due: 1 week from today

Spring, 2000

Individual Project

1. Create a framed page for your client. Set the initial main page to an appropriate page and use one frame as an index to the other frame, as shown in class. For example, the small frame could be a list of courses and the main frame could display the syllabi for each course selected in the small frame.
2. Create a page with bookmarks, as shown in class. For example, you could bookmark parts of the vita.
3. Create a page including a form for your client.
4. In an empty web, create a page with your own buttons, using the Image Editor. Insert dividers, choose your own background, and create an image map with hotspots. Include a bulleted list, a table, a scrolling marquee, and word art.

This should be done individually.

Due: one week from today